

Application No. 09/819,971
Confirmation No. 4223

Reply to Office Action Mailing Date December 29, 2004
Reply Date (via fax): Feb. 9, 2005

Amendments to the Specification

Please replace paragraphs [0032] through [0035] with the following amended paragraphs.

[0032] At step 202, a desired target 106 to be tracked is selected. This can be done by any means known in the art. Preferably, the target 106 is selected by centering the target 106a in the monitor's display 110a by manipulating the joystick 112 to control at least the pan and tilt motors 108 of the camera 102, and possibly the zoom motor 108.

At step 203, a computer model is build to represent the appearance of that target 106a.

At step 204 after selecting a desired target 106a, the automated video tracking system is switched to an automatic mode to initiate a tracking sequence to automatically track the selected desired target 106a. Switching to automatic mode can be achieved manually such as by selecting a button on a user interface (not shown) in the monitor's display 110a. However, it is preferred that the switch to automatic mode occurs automatically, preferably upon releasing control of the joystick 112 or other input

device used to select the desired target 106a. At step 205, the automated video tracking system calculates a confidence value whenever the tracker finds a part of the image that matches to the target model. The confidence value represents how well the target 106a matches the model. This number can vary for example from 0% match to 100% match. Where the 100% indicates that the target matches the model completely. A control can also be provided to indicate a threshold value for the confidence. At step 208, it is determined whether the confidence value falls below a threshold value. If so, at step 210, the operator is preferably warned by a signal of some form that the confidence is lower than the threshold and the tracking is about to fail and the process continues at step 214 where the system switches from automatic mode to manual mode in which case the operator may take over for the system for the time it takes for the target to pass the source of difficulty by reacquiring the target, after which control is given back to the automatic tracking system.

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[0033] If it is determined that the confidence value does not fall below the confidence threshold value at step 208, at A4-step 206-212 it is determined if the video tracking system has encountered a period of difficulty and has lost the selected target 106a or may be in jeopardy of losing the selected target 106a. The period of difficulty could result from the model matching the target with less than the threshold value. If not, the method proceeds along path 206a-212a and the automated video tracking system continues to automatically track the selected target until the method is terminated, the selected target 106a leaves the scene 104, or it is no longer desired to track the selected target 106a, all of which are shown schematically as steps 214-220 and 216-222. If the operator perceives a difficulty has or is about to be encountered, the method proceeds along path 206b-212b by switching from automatic mode to manual mode at step 208-214. In manual mode, the operator may take over for the system for the time it takes for the target to pass the source of difficulty by reacquiring the target, after which control is given back to the automatic tracking system. As with the switching into automatic mode, switching from automatic mode to manual mode can be manually done by the operator or automatically upon taking control of the joystick 112 or other input device used to select the desired target 106a.

[0034] Once in manual mode, the operator reacquires the desired target at step 210-216. It is preferred that the target is reacquired in a simpler manner as compared to the way it is initially selected, namely, by centering the desired target 106a in the monitor's display 110a of the scene 104 by manipulating the joystick 112 or other input device. However, those skilled in the art will appreciate that the desired target can be selected and/or reacquired by any means known in the art without departing from the scope or spirit of the present invention.

[0035] Once the target is reacquired, the automated video tracking system is switched back to the automatic mode at step 212-218 where desired target is automatically

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tracked without initiating a new tracking sequence. It is important for the operator to quickly reacquire the desired target 106a so that a new tracking sequence is not initiated after the target 106a is reacquired and automatic tracking restarted.

Preferably, automatic tracking restarts by either a manual instruction from the user, as discussed above, or preferably automatically by releasing control of the joystick 112 or other input device used to reacquire the desired target 106a. After switching back to automatic mode, the automatic video tracking system continues to track the reacquired target 106a until the target leaves the scene, tracking of the reacquired target is no longer desired, or another area of difficulty is encountered by the automatic tracking system, all of which are shown as steps 220-214 and 222-216.